Exemption No. 7981

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
KANSAS CITY, MISSOURI 64106

In the matter of the petition of	*	
CESSNA AIRCRAFT COMPANY	*	
	*	Regulatory Docket No.
for exemption from § 23.3(d)	*	FAA-2002-13603-1
of Title 14 of the Code of Federal Regulations	*	

GRANT OF EXEMPTION

By letter dated September 16, 2002, Mr. Wendell W. Corneil, Cessna Aircraft Company, One Cessna Boulevard, P.O. Box 7704, Wichita, KS 67277-7704 petitioned for an exemption from § 23.3(d) of Title 14 of the Code of Federal Regulations to permit type certification of the Cessna Model 525B airplane in the commuter category. The 525B is a business jet powered by twin turbofan engines with a takeoff weight of 13,870 pounds.

The petitioner requires relief from the following regulation(s):

Section 23.3(d), in pertinent part, limits the commuter category to propeller-driven airplanes.

The petitioner supports its request with the following information:

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The purpose of this letter is for Cessna Aircraft Company to petition FAA for an exemption, for Cessna Model 525B, from 14 CFR 23.3(d), wherein the commuter category is limited to propeller-driven, multiengine airplanes. The Cessna Model 525B is a twin-engine business jet with a takeoff weight of 13,870 lbs, and is a derivative of the Model 525A with a takeoff weight of 12,375 lbs. The Model 525B takeoff weight exceeds the 14 CFR Part 23 normal category maximum certification takeoff weight of 12,500 lbs or less.

Cessna Aircraft Company is petitioning for this exemption in accordance with paragraph 14 CFR 11.81 under Petitions for Rulemaking and for Exemptions.

A favorable ruling on this petition would allow Cessna Aircraft Company to offer the public a turbofan business aircraft built to a level of safety exceeding that defined in 14 CFR Part 23 regulations for the normal category. The Model 525A was type certificated in the normal category in June 2000 as a derivative of the Model 525 which was type certificated in the normal category in October 1992.

The safety record of the CitationJet series has been outstanding. There have been 592 CJ/CJ1/CJ2s produced since October 1992.

	Model 525/CJ	Model 525/CJ1	Model 525A/CJ2
Total Produced	359	136	97
Total In Service	356	136	96
Total Flight Hours	531,306	54,458	22,409
Total Landings	485,497	47,244	19,030
Ave Hours/Day	0.68	0.84	0.83
Total Lost by Accident	3*	0	1**

*No aircraft system/mechanical discrepancies were noted during the investigations of the loss of these aircraft

**Non-flight event – Runway incursion

These numbers were obtained from the CESCOM records maintained by the Cessna Customer Service Information department and are current as of 30, August 2002. As can be seen in the above table, the CitationJets have been flown a total of 608,173 hours and have made 551,771 landings. Of the 592 units produced since October 1992, 588 are still in service.

By granting this petition for exemption, the Cessna Model 525B will be built to a level of safety consistent with the technical requirements for commuter category aircraft in the 12,500 to 19,000 pound weight category which are allowed to carry up to 19 passengers.

The planned certification basis for the Cessna Model 525B is currently being reviewed by the Wichita ACO. Granting this exemption will assure that the certification basis will align with the standards of the 14 CFR Part 23 commuter category.

While 14 CFR 23.3(d) clearly states that commuter category only applies to "propeller driven, multiengine airplanes", the application of commuter category requirements to Cessna Aircraft Company's Model 525B aircraft, along with any possible special conditions, would have no impact on the powerplant installation of the aircraft. The current 14 CFR Part 23 rules clearly cover turbine powered installations, including turboprop, turbojet, and turbofan engines.

There is no technical reason to exclude turbofan powered aircraft from certification in the commuter category. There are substantial reliability and safety design differences and demonstrated history to permit their inclusion. A turbofan is an inherently simpler mechanical device than a turboprop, having neither propellers nor propeller drive speed reduction gear boxes and their related mechanical and electrical controls, actuators, and sensors that are needed to control speed, permit feathering, and unfeathering, with the associated failure modes and effects.

The turbofan is simpler and less work-intensive to operate because there are fewer systems to control monitor and manage. Pilot workload is reduced. Worldwide service history has demonstrated that turbofans are inherently safer than turboprops because of their reduced mechanical and operational complexity and resulting in reduced potential for mechanical failure or crew error.

In the five year period from 1997 to 2001, the U.S. fleet of business jet aircraft experienced an accident rate of 0.38 per 100,000 hours of operation, and a fatal accident rate of 0.09 per 100,000 hours of operation. During the same period, the U.S. fleet of business turboprop aircraft experienced an accident rate of 1.37 accidents per 100,000 hours of operation, and a fatal accident rate of 0.47 per 100,000 hours of operation. The turboprop accident rate is 260 percent greater and the fatal accident rate is 422 percent greater than the turbofan rates.

The picture does not change when looking at a longer period. During the 37 years from 1964 to 2001, the U.S. fleet of business jet aircraft experienced an accident rate of 1.04 accidents per 100,000 hours of operation, and a fatal accident rate of 0.28 fatal accidents per 100,000 hours of operation. By comparison, during the same period, the U.S. fleet of business turboprop aircraft experienced an accident rate of 2.27 accidents per 100,000 hours of operation, and a fatal accident

rate of 0.80 fatal accidents per 100,000 hours of operation. The turboprop accident rate is 118 percent greater and the fatal accident rate is 185 percent greater than the turbofan rates. (These data were compiled by Robert E. Breiling Associates and the appropriate pages are attached.)

These data clearly illustrate that, not only would the granting of this exemption enabling the use of turbofan engines on a commuter category aircraft not adversely affect safety, doing so would certainly increase the safety of the business fleet.

One area where turbofan equipment offers a significant safety advantage over propeller driven equipment is the realm of rotor burst failure versus catastrophic failure of a propeller blade. Turbine powered aircraft have well defined criteria for rotor burst protection. However, the challenge of developing a (propeller) blade containment strategy has been largely held to be technologically unfeasible. The loss of a propeller blade can result in human injury from uncontained debris and damage to airframe integrity due to an unbalanced propeller condition. A turbofan engine is less likely to experience the latter unbalanced condition. The Cessna Model 525B has the engines mounted on the aft fuselage consistent with 30 years of Cessna Citation design experience and in compliance with rigorous rotor non-containment criteria developed over the years with the FAA.

It should be further noted that turbofans are inherently safer than propeller driven aircraft in ground operations, where the rotating large diameter propeller creates a lethal hazard to people in proximity to the aircraft. An idling turbofan, by contrast, does not present this hazard.

It is the opinion of Cessna Aircraft Company that by granting this petition, the public interest would be served. The technological development of new smaller turbofan engines has created the potential for simple, low-cost aircraft with greater utility and a higher level of safety than ever before. The commuter category, as initially created, was a means to certify aircraft intended for regional airline operations. This category soon took on a second and equally important role. The first two aircraft ever certified to commuter category, the Beech Starship and the Beech King Air, B300, were used primarily as business aircraft and in the on-demand-charter segment of 14 CFR Part 135.

Because the first two commuter category airplanes certified were neither intended to be used, nor have they been used, primarily as regional airliners, they set the precedent for use of commuter category as a term used to define a level of certification and safety, not the end use of the airplanes. Therefore, the Cessna Model 525B mission as a business jet, not as a regional airliner, is germane for consideration of this exemption.

The Beech Starship and the Beech B300 have performed successfully and safely throughout the decade of the 1990s, demonstrating the appropriateness of the application for commuter category aircraft. These aircraft have also benefited the public by serving in the roles of business transport and on-demand-charter. If the Starship and the King Air B300 had been limited to normal category, they could not have given the public service that these airplanes provide today. Because of the commuter category these airplanes have been able to provide services otherwise unavailable at comparable cost – largely because of their expanded capabilities, owing to being certified in the commuter category. Granting this petition would give the public access to more

reliable and safe turbofan powered aircraft in this category.

The traveling public in the United States has overwhelmingly come to view aircraft equipped with propellers as less desirable and less safe than turbofan powered aircraft. Approval of this request for exemption would give consumers the option of choosing a turbofan powered airplane when their travel needs call for an aircraft in the weight and performance category encompassed by the commuter category. The vast majority of the traveling public would regard this as a significant benefit.

Granting of this petition for exemption would enhance the value and marketability of the Cessna Aircraft product line creating a resultant increase in employment of personnel at the Wichita, Kansas facility during an economically depressed period. Cessna Aircraft Company is projecting that demand for the Model 525B certified to commuter category will help stabilize employment in the Wichita, Kansas Mid-Continent facility through 2011.

In summary, *Cessna Aircraft Company is petitioning for exemption to 14 CFR Part 23 paragraph 23.3(d), to permit Type Certificate Data Sheet A1WI to include the Model 525B, under the Part 23 Commuter Category. 14 CFR 23.3(d) limits commuter category to propeller-driven multiengine airplanes. The Model 525B is a turbofan powered business jet, a derivative of the Models 525/525A, certified in 14 CFR Part 23 normal category. The Model 525B will have a takeoff weight which has been increased to13,870 lbs, which exceeds the 14 CFR Part 23 normal category maximum certification takeoff weight of 12,500 lbs or less.*

Cessna Aircraft Company respectfully submits that the preceding discussion and rationale is ample justification under the provisions set forth in 14 CFR 11, for grant of the requested exemptive relief."

BUSINESS JET ACCIDENT RATES 1964 – 2001
U.S. & WORLD (Accidents/100,000 hrs.)

	U.S. Fleet		World Fleet	
Aircraft	Accident Rate	Fatal Accident Rate	Accident Rate	Fatal Accident Rate
BAe-125-700	0.27	0	0.57	0.17
BAe-125-800	0	0	0.06	0
BAe-125-1000	0	0	0	0
HS-125 (other)	1.55	0.24	2.18	0.47
CL-600	1.05	0.21	0.94	0.19
CL-601/604	0.18	0	0.13	0
CL-700	0	0	0	0
CE-500/501	1.21	0.25	1.49	0.46
CE-525-I	1.94	0.83	1.72	0.77
CE-550/551/Bravo	0.61	0.13	0.74	0.19
CE-560/Ultra/Excel	0.13	0.07	0.29	0.11
CE-650	0.47	0	0.56	0.12
CE-750	0	0	0	0
DA-10/100	1.09	0.23	1.45	0.36
DA-20/200	0.77	0.12	0.94	0.15
DA-50 Series	0.24	0.08	0.23	0.11
DA-900 Series	0.72	0	0.43	0.11
DA-2000	0	0	0	0
L-23	6.06	1.88	6.01	1.97
L-24/25/28/29	2.43	0.80	2.72	1.10
L-35/36	0.87	0.32	1.13	0.55
L-31	3.29	0	2.89	0
L-31A	0.35	0	0.53	0.27
L-55	0.61	0.24	1.01	0.30
L-60	0.88	0	0.91	0
L-45	0	0	0	0
G-II/IIB	0.74	0.29	0.83	0.40
G-III	0.08	0.08	0.20	0.07
G-IV	0.14	0.07	0.12	0.06
G-V	0	0	0	0
IAI-1121	3.73	1.87	3.48	1.74
IAI-1123	3.70	0	2.68	0
IAI-1124	0.70	0.18	1.01	0.42
IAI-1125	0.29	0	0.25	0
IAI-1126	0	0	0	0
L-1329	2.56	0.48	2.01	0.42
BJ-400/400A	0.50	0.18	0.50	1.00
MU-300	1.29	0.18	1.69	0.34
NA-265	1.60	0.38	1.60	0.46
Fleet Average	1.04	0.28	1.23	0.40

Information is based on accidents reported by NTSB/CAA/DOT and other international reporting organizations. Cumulative flight hours are compiled from date supplied by the airframe manufacturers. Accident rates are predicated on all civil accidents regardless or aircraft use and/or exposure. Manufacturer flight test and military operated civil aircraft accidents are excluded.

U.S. BUSINESS TURBOPROP FLEET ACCIDENT RATES

(Accidents/100,000 hrs.)

Aircraft	All Years Operation 1964 - 2001 Accident Rate	All Years Operation 1964 - 2001 Fatal Accident Rate	Five Year Operation 1997 - 2001 Accident Rate	Five Year Operation 1997 - 2001 Fatal Accident Rate
BE-90	2.18	0.68	1.49	0.47
BE-100	1.84	040	1.08	0.36
BE-200	0.98	0.28	0.94	0.28
BE-300	0.48	0.24	0.83	0.28
BE-350	0	0	0	0
BE-2000	0.81	0	0	0
Conquest I (CE-425)	1.65	0.55	0.89	0.30
Conquest II (CE-441)	1.93	0.94	0.66	0.22
CE-208 Caravan	2.00	0.88	1.86	0.79
PA-31T Cheyenne I/II	2.35	1,01	1.50	0.50
PA-42 Cheyenne III	0.68	0.32	0	0
Turbo Cdr. Series	3.97	1.50	1.29	0.20
Gulfstream I (G-159)	0.93	0.17	0.83	0.83
Mitsubishi MU-2	4.68	1.98	1.98	0.99
Merlin I/II/III Series	3.81	0.90	2.33	0.78
TBM-700	2.00	0.567	3.38	1.35
Pilatus PC-12	1.11	0	1.40	0
PA-45-TP500	15.63	5.21	15.63	5.21
Fleet Average	2.27	0.80	1.37	0.47

Information is based on the number of accidents involving U.S registered aircraft and cumulative flight hours compiled from manufacturer supplied flight hours where available and/or NBAA/NATA utilization surveys.

Accident rates am predicated on all operational aircaft accidents regardless of aircraft use and/or exposure, which should be considered.

BUSINESS JET ACCIDENT RATES FIVE YEARS 1997 – 2001
U.S. & WORLD (Accidents/100,000 hrs.)

	U.S. Fleet		World Fleet	
Aircraft	Accident Rate	Fatal Accident Rate	Accident Rate	Fatal Accident Rate
BAe-125-700	0.45	0	0.46	0.23
BAe-125-800	0	0	0	0
BAe-125-1000	0	0	0	0
HS-125 (other)	0.88	0	0.43	0
CL-600	0.70	0	0.79	0
CL-601/604	0	0	0	0
CL-700	0	0	0	0
CE-500/501	0.64	0.21	1.94	0.49
CE-525-I	1.68	1.01	1.39	0.93
CE-550/551/Bravo	0.14	0.07	0.17	0.06
CE-560/Ultra/Excel	0.09	0	0.24	0.08
CE-650	0.49	o	0.45	0
CE-750	0	0	0	0
DA-10/100	0.23	0	0.82	0
DA-20/200	1.11	0	1.13	0.28
DA-50 Series	0	0	0	0
DA-900 Series	1.04	0	0.84	0.21
DA-2000	0	0	0	0
L-23	0.19	0	0.45	0
L-24/25/28/29	0.72	0.26	0.79	0.33
L-35/36	0.53	0.09	0.64	0.19
L-31	1.52	0	1.97	0.99
L-31A	0.46	0	0,89	0
L-45	0	0	0	0
L-55	0.53	0.27	0.56	0.28
L-60	0.98	0	0.51	0
G-II/IIB	0.55	0	0.72	0
G-III	0.17	0.17	0.51	0.25
G-IV	0	0	0	0
G-V	0	0	0	0
IAI-1121	1.11	1.11	1.02	1.02
IAI-1123	0	0	0	0
IAI-1124	0.35	0.18	0.60	0.40
IAI-1125	0	0	0	0
IAI-1126	0	0	0	0
L-1329	1.26	0	0.91	0
BJ-400/400A	0.19	0	0.15	0
MU-300	1.08	0	1.19	0
NA-265	0.59	0.35	0.93	0.66
BBJ	0	0	0	0
Air Bus	0	0	0	0
Fleet Average	0.38	0.09	0.52	0.16

Information is based on accidents reported by NTSB/CAA/DOT and other international reporting organizations. Cumulative flight hours are compiled from date supplied by the airframe manufacturers. Accident rates are predicated on all civil accidents regardless or aircraft use and/or exposure. Manufacturer flight test and military operated civil aircraft accidents are excluded.

Comments on published petition summary:

A summary of this petition was published in the FEDERAL REGISTER for public comment on December 12, 2002 (67 FR 76437). The comment period closed January 2, 2003. No comments were received

The Federal Aviation Administration's (FAA) analysis is as follows:

To obtain this exemption, the petitioner must show, as required by § 11.25(b)(5), that: (1) granting the request is in the public interest, and (2) the exemption will not adversely affect safety, or that a level of safety will be provided that is equal to that provided by the rules from which the exemption is sought.

The FAA has carefully reviewed the information contained in the petitioner's request for exemption.

The FAA agrees with the substance of the petitioner's argument and supporting data and finds no reason to deny the petition. In the interest of efficiency, this analysis addresses substantive issues only.

On February 7, 2002, Cessna applied to amend Type Certificate A1W1 to add the Model 525B, a turbofan powered business jet with up to nine seats for nonfare paying passengers. The previous models of this airplane, 525 and 525A, were certificated in the normal category. The type certification basis includes 14 CFR part 23, § 23.562, emergency landing dynamic conditions that applies to normal, utility, and acrobatic category airplanes. On September 16, 2002, Cessna petitioned for exemption to 14 CFR part 23, § 23.3(d) to permit type certification of the 525B in the commuter category.

While the commuter category represents an overall higher level of safety than the normal category, § 23.562 does not apply to the commuter category. Without this exemption to § 23.3(d), the Model 525B would otherwise be certificated in the transport category because it is turbofan instead of propeller-driven with a design gross takeoff weight of 13,870 pounds. Therefore, compliance with § 23.562 is required for this grant of exemption as noted in the conditions and limitations section. This exemption allows the Model 525B to be certificated in the commuter category and by specifying that it meet the requirements of § 23.562, the FAA is ensuring the appropriate level of safety.

Regarding public interest, the FAA believes that granting the exemption helps realize the potential public benefit created by the advent of newer smaller turbofan engines. The resultant simpler, lower-cost business jets having

weights up to 19,000 pounds provides the public with greater utility and an extended range of choices.

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not adversely affect safety. Therefore, pursuant to the authority contained in Sections 313(a) and 601(c) of the Federal Aviation Act of 1958, as amended, delegated to me by the Administrator (14 CFR 11.53), Cessna Aircraft Corporation is granted an exemption from § 23.3(d) of the Federal Aviation Regulations to the extent necessary to allow type certification of the Cessna Model 525B airplane without an exact showing of compliance with the requirements of § 23.3(d). For the Model 525B, this exemption is subject to the following conditions and limitations:

1. The Cessna Model 525B airplane shall be limited to be a multi-engine airplane that has a seating configuration, excluding pilot seats, of 19 or less, and a maximum certificated takeoff weight of 19,000 pounds or less. The Cessna Model 525B operation is limited to any maneuver incident to normal flying, stalls (except whip stalls), and steep turns, in which the angle of bank is not more than 60 degrees.

2. Each seat/restraint system used in the Model 525B is to meet the requirements of 14 CFR part 23, § 23.562 for emergency landing dynamic conditions. This requirement shall be documented on the type certificate data sheet.

Issued in Kansas City, Missouri on March 7, 2003

Dorenda D. Baker
Acting Manager
Small Airplane Directorate
Aircraft Certification Service